

STIC SEARCH

I. PATENT LITERATURE BIBLIOGRAPHIC DATABASES

Set	Items	Description
S1	6791	IMPLANT?()MEDICAL?() (DEVICE? OR APPARATUS? OR APPLIANCE? OR INSTRUMENT?) OR (IMD OR IMDS) (5N) (IMPLANT? OR MEDICAL?)
S2	15041	PACEMAK? OR (PACE OR PACING) () (MAKE? OR MAKING) OR (ELECTR- ONIC? OR VIVO OR INVIVO OR INTRACORPOR? OR ENDOPROSTHE?) (2N) I-
S3	18451	MPLANT? OR (DEFIB? OR ELECTR?()STIMULAT?) (2N) IMPLANT? (HEART? OR CARDIAC? OR VENTRICULAR? OR ATRIAL? OR BIVENTRI- C? OR BIATRIAL? OR ATRIOVENTRICUL? OR CARDIO? OR MYOCARD? OR - CORONARY? OR ENDOCARD? OR INTRACARDI?) (2N) (STIMULAT? OR IMPLA- NT? OR DEVICE? OR APPARATUS? OR APPLIANCE?)
S4	4667	(PACESET? OR DEFIBRILLAT? OR DE()FIBRILLAT? OR (RHYTHM? OR ARRHYTHM?) (2N) (CONTROL? OR MANAG?) (2N) (STIMULAT? OR IMPLANT? OR DEVICE? OR APPARATUS? OR APPLIANCE?)
S5	31094	S1:S4
S6	42	PILLBOX? OR (PILL OR PILLS OR TABLET? OR MEDICAMENT?) () (DI- SPENS? OR BOX OR BOXES) OR (INTRAIVEN? OR IV OR INTRA()VENOUS?-) () (APPLIANCE? OR DEVICE? OR APPARATUS?) OR INHALER?
S7	625	(TRANSCUTAN? OR TRANSDERM? OR SUBCUTAN?) (3N) (PATCH? OR PUM- P? OR APPLICATION? OR IMPLANT? OR DISPENS? OR DEVICE? OR APPA- RATUS? OR APPLIANCE?)
S8	2585	MEDICAT? OR MEDICAMENT? OR PHARMAC?
S9	3563	DRUG OR DRUGS OR (BIOLOGICAL OR THERAPEUTIC? OR ANTICARCIN- O? OR ANTISTENOT? OR ANTISTENOS?) () (AGENT? OR COMPOUND? OR SU- BSTANCE? OR CARRIER? OR DILUENT? OR BUFFER? OR ADJUVANT? OR E- XCIPIENT? OR SURFACTANT? OR STABILIZER? OR STABILISER?)
S10	2097	PHARMACEUTIC? OR BIOPHARMACEUTIC? OR CHEMOTHERAP? OR TRANS- DERM? (2N) ABSOR? OR ANALGESI? OR NSAID? OR ANESTHET? OR ANAEST- HET? OR PAINKILLER? OR PAIN()KILLER? OR OPIATE?
S11	2836	(CHEMIC? OR MEDIC? OR THERAP? OR PHARM?) (2N) (AGENT? ? OR S- UBSTANCE? OR COMPOUND?) OR MEDICINE? OR MEDICINAL? OR PRESCRI- PTION? OR CHEMOTHERAP? OR MEDICAMENT?

S12 302 PRESCRIB?(2N)(DOSE? ? OR DOSAGE? OR AMOUNT? OR PAYLOAD?
 OR
 QUANTITY? OR QUANTITIE? OR MEASUR?(2N)PORTION? OR SUPPLY
 OR R-
 ATION? ? OR ALLOWANCE?) OR PHARMACOLOGY?
 S13 273 THERAPEUTIC?() (FORMULATION? OR SUBSTANCE?) OR
 MEDICAL?()FO-
 RMULATION? OR NARCOTIC? OR PHARMACOL?(2N)(THERAP? OR
 TREATMEN-
 T? OR SUBSTANC?) OR MED OR MEDS OR PHARMACOTHERAP? OR
 PHARMAT-
 HERAP?
 S14 10832 DELIVER? OR PUMP? OR TRANSFER? OR INFUS? OR PERFUS?
 S15 7374 SUPPLY? OR INHAL? OR DISCHARG? OR DISTRIBUT? OR
 DISPENS? OR
 INJECT? OR ADMINISTER? OR ADMINISTRAT?
 S16 5411 SUFFUS? OR CONVEY? OR DEPLOY? OR RELEAS? OR TRANSPORT?
 OR -
 INTRODUC?
 S17 5974 TRANSFUS? OR TRANSMIT? OR TRANSMISS? OR SUPPLY? OR
 PUSH?
 S18 665 S5 AND S6:S7
 S19 3210 S5 AND S8:S13(10N)S14:S17
 S20 3699 S18:S19
 S21 334 WIRELESS? OR WIRE()LESS? OR BLUETOOTH? OR REMOTE? OR
 INTER-
 ACTIV? OR BIDI OR BI()DI OR (BI OR TWO OR 2)()DIRECTION?
 S22 167 TRANSPONDER? OR TRANSMITTER? OR TRANSCEIVER? OR
 RFTRANSMIT?
 OR RFTRANSPOND? OR RFTRANSCEIVER? OR REMOTE(2N)(TRANSMIT?
 OR
 TRANSMISS?)
 S23 1 (WIRELESS? OR CELLULAR? OR CELL)()COMMUNICAT?R?
 S24 100 TRANSMITT?(3N)RECEIV? OR TRANSMIT?(2N)RESPOND?R?
 S25 4 (2WAY OR TWO()WAY OR 2()WAY)() (RADIO? OR COMMUNICAT? OR
 BL-
 UETOOTH OR IEEE802? OR IEEE() (80211 OR 802()11) OR
 WIRELESS? -
 OR WIRE()LESS OR WAP)
 S26 65 TELEMET?() (DEVICE? OR APPARATUS?) OR
 TRANSMITT?R?(2N)DETEC-
 T?R?
 S27 18 RFID OR RADIO()FREQUENC?()IDENTIF? OR RF()IDENTIF? OR
 TRIR-
 M? ?
 S28 0 XPDR? ? OR XPNDR? ? OR TPDR? OR TPNDR? OR RADIOTELEMET?
 S29 6 INTERROGATOR? OR INTERROGATER? OR CELLULAR() (DEVICE? OR
 AP-
 PARATUS?)
 S30 1689 MONITOR? OR INTERROGAT? OR SENSE? OR SENSING OR
 TRANSDUC? -
 OR DETECT? OR TELESENS? OR BIOSENS? OR BIOMEASUR? OR
 SENSOR?
 S31 909 DETERMIN? OR PREDICT? OR INTUIT? OR EXTRAPOLAT? OR
 INTERPO-
 LAT? OR ANALYZ? OR ANALYS? OR ANALYT? OR ASSESS?

S32 1166 DIAGNOS? OR CALCULAT? OR EVALUAT? OR QUANTIFY? OR
 QUANTIFI?
 OR TRACK? OR MEASUR? OR TELEMONITOR? OR CORRELAT? OR
 DIFFERE-
 NTIAT?
 S33 521 DISAMBIGUAT? OR COLLAT? OR ASCERTAIN? OR APPRAIS? OR
 ESTIM-
 AT? OR DERIVE? OR DERIVING OR DERIVATION?
 S34 84 QUANTITAT? OR PROGNOST? OR SURVEY? OR BIOMEASUR? OR
 DEDUCE?
 OR DEDUCING? OR RECOGNI?
 S35 409 DISCERN? OR PERCEIV? OR REGISTER? OR RECORD? OR CAPTUR?
 OR
 DEDUCTION? OR COMPUTE OR COMPUTES OR COMPUTED OR COMPUTING
 S36 516 COMPARAT?R? OR COMPARE? OR COMPARISON? OR COMPARING OR
 EXT-
 RACT? OR EMPIRIC? OR BIOMONITOR?
 S37 143 ALERT? OR NOTIF? OR CODE()BLUE? OR CALLOUT? OR
 CALL() (OUT -
 OR OUTS) OR DISTRESS() (CALL? OR SIGNAL?) OR SOS OR S()O()S
 OR
 MAYDAY? OR MAY()DAY? OR MAIDEZ OR M()AIDEZ
 S38 86 REMINDER? OR NOTIFICAT? OR NOTIFY? OR NOTIFIE? OR CUE
 OR C-
 UES OR PROMPT OR PROMPTS OR CUEING OR CELLNOTIF? OR
 ENOTIF? OR
 (EMAIL? OR TEXT?) (2N)ALERT?
 S39 105 ALARM? OR WARNING? OR (AURAL? OR AUDITOR? OR GRAPHIC?
 OR V-
 ISUAL? OR VIDEO? OR EMAIL? OR TEXT?) (2N) (SIGNAL? OR
 ANNOUNCEM-
 ENT? OR INDICAT? OR ENUNCIAT?)
 S40 37 (AURAL? OR AUDITOR? OR SONIC? OR SOUND? OR ACOUSTIC? OR
 EM-
 AIL? OR TEXT?) (2N) (SIGNAL? OR BEEP? OR BELL? OR RING? OR
 BUZZ-
 ER? OR NOTIF? OR HORN? OR WHISTLE? OR SIREN? OR ALERT?)
 S41 106 CLOSEDLOOP? OR CLOSE?() LOOP OR FEEDBACK? OR FEED?()BACK
 S42 172 INTERACT? OR INTER()ACTIV? OR (TASK? OR ENVIRONMENT? OR
 SU-
 RROUNDING?()) (SENSITIV? OR CONDITIONAL?)
 S43 99 BIDIRECTION? OR BI()DIRECTION? OR ADAPTIV? OR (SELF? OR
 AU-
 TO()) ADJUST? OR CUSTOMIZ? OR CUSTOMIS? OR PERSONALIZ? OR
 PERS-
 ONALIS? OR INDIVIDUALIS? OR INDIVIDUALIZ?
 S44 37 DUALWAY? OR DUALDIRECTION? OR (TWO OR BI OR DUAL? OR 2
 OR -
 2WAY OR TWOWAY OR BOTH) () (DIRECTION? OR WAY? ?)
 S45 5 BACK(2W)FORTH OR TWOWAY? OR BOTH() (WAY? ? OR
 DIRECTION?) OR
 BIDI? ? OR BI()DI
 S46 9 AU=IFEREK-PETRIC B? OR PEREK B? OR PETRIC B? OR
 FEPEKPERIC
 B? OF PEREK()PETRIC B?
 S47 5 AU=IFARKENTIN D? OF ARKENTIN D? OR WARKENTIN, D? OR
 WARKS-

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NTIN, DN)
S48 9 AU=(FEREK-PETRIC, B? OR FEFEX, B? OR PETRIC, B? OR
FEFERPE- TRIC, B? OR FEFEX)PETRIC, B?)
S49 0 (FEREK-PETRIC OR FEFEX OR PETRIC OR FEFEX)PETRIC OR
FEFERK() PETRIC) (2N)B0ZID)
S50 0 WARRENTIN(2N)B0ZID)
S51 2271 IC=(A61B? OR A61M? OR A61N? OR G06F?)
S52 3403 MC=(B07? OR B11? OR B12? OR D09? OR D22? OR P31? OR
P34? OR S05? OR T01? OR W05?)
S53 454 S20 AND S21:S29 AND S30:S36
S54 12 S46:S50
S55 4 S54 AND AY=1950:1999
S56 1 S54 NOT AY=2000:2010
S57 4 S55:S56
S58 4 IDPAT (sorted in duplicate/non-duplicate order)
S59 4 IDPAT (primary/non-duplicate records only)
S60 452 S53 NOT S57
S61 115 S60 AND S41:S45
S62 33 S61 AND S37:S40
S63 115 S61:S62
S64 23 S63 AND AY=1950:1999
S65 12 S63 NOT AY=2000:2010
S66 23 S64:S65
S67 23 IDPAT (sorted in duplicate/non-duplicate order)
S68 23 IDPAT (primary/non-duplicate records only)
S69 429 S60 NOT S66
S70 361 S69 AND S1:S4(15N)S6:S17
S71 353 S70 AND (S1:S4 OR S6:S17) (15N)S21:S45
S72 349 S71 AND S51:S52
S73 43 S72 AND AY=1950:1999
S74 30 S72 NOT AY=2000:2010
S75 43 S73:S74
S76 43 IDPAT (sorted in duplicate/non-duplicate order)
S77 43 IDPAT (primary/non-duplicate records only)
S78 386 S69 NOT S75
S79 318 S78 AND S70:S72
S80 386 S78:S79
S81 14 S80 AND AY=1950:1999
S82 10 S80 NOT AY=2000:2010
S83 14 S81:S82
S84 14 IDPAT (sorted in duplicate/non-duplicate order)
S85 14 IDPAT (primary/non-duplicate records only)

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? show files

File 347:JAPIO Dec 1976-2010/Apr(Updated 100726)
(c) 2010 JPO & JAPIO
File 350:Derwent WPIX 1963-2010/UD=201052
(c) 2010 Thomson Reuters

Dialog eLink: [Order File History](#)
 59/5,K/2 (Item 2 from file: 350)
 DIALOG(R)File 350: Derwent WPIX
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0010824540 *Drawing available*
 WPI Acc no: 2001-441803/200147
 Related WPI Acc No: 2004-374259
 XRAM Acc no: C2001-133543
 XRPX Acc No: N2001-326797

Interactive remote drug dose-physiologic response monitoring system for implantable medical devices, comprises monitoring physiological signs for compliance with prescriptive regimen and checking drug interaction in patient

Patent Assignee: MEDTRONIC INC (MEDT)

Inventor: **TEREK PETRIC B; WARKENTIN D H**; WARKENTIN H

Patent Family (8 patents, 23 countries)

Patent Number	Kind	Date	Application Number	Kind	Date	Update	Type
WO 2001049364	A2	20010712	WO 2000US31890	A	20001120	200147	B
US 20020111512	A1	20020815	US 1999475709	A	19991230	200256	E
			US 2002123958	A	20020417		
EP 1246663	A2	20021009	EP 2000980586	A	20001120	200267	E
			WO 2000US31890	A	20001120		
US 6471645	B1	20021029	US 1999475709	A	19991230	200274	E
US 6824512	B2	20041130	US 1999475709	A	19991230	200479	E
			US 2002123958	A	20020417		
EP 1246663	B1	20050202	EP 2000980586	A	20001120	200510	E
			WO 2000US31890	A	20001120		
DE 60017943	E	20050310	DE 60017943	A	20001120	200519	E
			EP 2000980586	A	20001120		
			WO 2000US31890	A	20001120		
DE 60017943	T2	20060112	DE 60017943	A	20001120	200611	E
			EP 2000980586	A	20001120		
			WO 2000US31890	A	20001120		

Priority Applications (no., kind, date): US 1999475709 A 19991230; US 2002123958 A 20020417

Dialog eLink: [Order File History](#)
 59/5,K/4 (Item 4 from file: 350)
 DIALOG(R)File 350: Derwent WPIX
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0007886750 *Drawing available*
 WPI Acc no: 1996-518436/199651
 XRPX Acc No: N1996-436877

Venous pooling detection in human body and associated therapy device - has blood flow velocity measurement arrangement and device with dual chamber cardiac pacemaker and drug delivery system.

Patent Assignee: PACESETTER AB (PACE-N)

Inventor: BREYER B. ~~FEREK-PETRIC B.~~ FERKEPETRIC B

Patent Family (6 patents, 18 countries)

Patent Number	Kind	Date	Application Number	Kind	Date	Update	Type
WO 1996035476	A1	19961114	WO 1996EP1933	A	19960508	199651	B
US 5913879	A	19990622	WO 1996EP1933	A	19960508	199931	E
			US 1997952201	A	19971106		
JP 11508779	W	19990803	JP 1996533750	A	19960508	199941	E
			WO 1996EP1933	A	19960508		
EP 959945	A1	19991201	EP 1996919719	A	19960508	200001	E
			WO 1996EP1933	A	19960508		
EP 959945	B1	20010808	EP 1996919719	A	19960508	200146	E
			WO 1996EP1933	A	19960508		
DE 69614413	E	20010913	DE 69614413	A	19960508	200161	E
			EP 1996919719	A	19960508		
			WO 1996EP1933	A	19960508		

Priority Applications (no., kind, date): HR 1995278 A 19950508

Alerting Abstract WO A1

A detection device includes a cardiac lead [10,11] carrying at least one sensor [18,19] for blood flow measurement at a position which is located in a blood vessel and/or inside a human heart when the lead is implanted in the heart. An electronic circuit is connected to the sensor for blood flow velocity measurement, timing, and processing of the blood flow velocity data.

The circuitry includes a microprocessor which detects a decrease of the value of subsequent blood flow velocity waves each of the same kind and to provide in response a

venous pooling detection signal. An implantable therapy device comprises a dual chamber cardiac pacemaker and a drug delivery system.

USE - Prevents vasovagal syncope and relates to the predicts neurally mediated bradycardia and hypotension.

Dialog eLink: [Order File History](#)

68/5,K/8 (Item 8 from file: 350)

DIALOG(R)File 350: Derwent WPIX

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0010690606

WPI Acc no: 2001-300285/200131

XRAM Acc no: C2001-092212

XRPX Acc No: N2001-215479

Methods for treating medical disorders, particularly brain disorders selected from epilepsy, comprises using heat transfer, electrical stimulation or delivery of medication

Patent Assignee: UNIV JOHNS HOPKINS (UYJO)

Inventor: LESSER R P; MIZUNO-MATSUMOTO Y; MOTAMEDI G K; WEBBER W R S

Patent Family (6 patents, 92 countries)

Patent Number	Kind	Date	Application Number	Kind	Date	Update	Type
WO 2001028622	A2	20010426	WO 2000US28814	A	20001019	200131	B
AU 200112134	A	20010430	AU 200112134	A	20001019	200148	E
US 20030171685	A1	20030911	US 1999160328	P	19991019	200367	E
			US 2000201188	P	20000502		
			US 2000691051	A	20001019		
			US 2003413520	A	20030415		
US 6882881	B1	20050419	US 1999160328	P	19991019	200527	E
			US 2000201188	P	20000502		
			US 2000691051	A	20001019		
US 20050149123	A1	20050707	US 1999160328	P	19991019	200547	E
			US 2000201188	P	20000502		
			US 2000691051	A	20001019		
			US 2003413520	A	20030415		
			US 200573683	A	20050308		
US 7228171	B2	20070605	US 1999160328	P	19991019	200737	E

		US 2000201188	P	20000502
		US 2000691051	A	20001019
		US 2003413520	A	20030415

Alerting Abstract WO A2

NOVELTY - A method of treating a medical disorder comprises: (a) surgically implanting into a patient at least one **sensor** element; (b) attaching a management unit such that a micro controller of the management unit is connected to at least one **sensor** element; (c) connecting the management unit via a lead bundle to at least one stimulating electrode and at least one treatment device.

DESCRIPTION - A method of treating a medical disorder comprises:

- A. surgically implanting into a patient at least one **sensor** element capable of **detecting** and conveying cell signals;
- B. attaching a management unit such that a micro controller of the management unit is connected to at least one **sensor** element; and
- C. connecting the management unit via a lead bundle to at least one stimulating electrode and at least one treatment device such that a stimulation switch sends one or more current pulses to the at least one stimulating electrode and the at least one treatment device.

At least one treatment device is selected from electrical stimulation, heat **transfer**, magnetic stimulation and **medication delivery** devices. It is responsive to signals from at least one **sensor** element, mathematical algorithms of the management unit perform one or more mathematical **analyses** comprising **quantification** of waveform amplitude, slope, curvature, rhythmicity, time-lag or frequency as well as **analysis** based on wavelets such as wavelet-cross **correlation analysis** and time-lag **analysis** of cell signals to **prompt** delivery of electrical stimulation and at least one treatment to cells responsible for the medical disorder.

INDEPENDENT CLAIMS are also included for:

1. a method of treating a brain disorder by **electrical stimulation** by:
 - A. surgically **implanting** into a patient one or more electrical **sensor** elements capable of **detecting** and conveying signals from brain cells;
 - B. surgically **implanting an electrical stimulator** control unit into a body cavity of the patient such that a microcontroller of the electrical stimulator unit is connected to the one or more electrical **sensor** elements in contact with brain cells; and
 - C. connecting the electrical stimulator control unit to one or more stimulating electrodes via a lead bundle, the stimulating electrodes being capable of delivering to brain cells one or more symmetric or asymmetric current pulses; whereby responsive to signals from the one or more electrical **sensor** elements, mathematical algorithms of the micro controller perform

one or more mathematical **analyses** including **quantification** of waveform amplitude, slope, curvature, rhythmicity, time-lag, or frequency as well as **analyses** based on wavelets such as wavelet cross-**correlation analysis** of brain cells signals so as to **predict** onset of seizure activity thereby causing a stimulating switch to **prompt** stimulating electrodes to deliver the one or more symmetric or asymmetric current pulses to the brain, thereby halting abnormal brain cell activity in the patient; and

2. a device for treating a medical disorder comprises:
 - A. at least one **sensor** element capable of **detecting** and conveying cell signals;
 - B. a management unit positioned such that a microcontroller of the unit connects to the **sensor** element(s);
 - C. an electrical stimulation device connected to the unit via a lead bundle such that a stimulation switch sends one or more current pulses to the electrical stimulation device; and
 - D. optionally at least one other treatment device; whereby responsive to signals from the **sensor** element(s), mathematical algorithms of the unit perform **analyses** including wavelet cross **correlation analysis** to **prompt** delivery of one or more current pulses and optionally at least one other treatment to organs tissues or cells responsible for the disorder.

ACTIVITY - Analgesic; hemostatic; neuroprotective; antiinflammatory; anticonvulsant.

MECHANISM OF ACTION - Neuronal tissue stimulator.

The value of wavelet cross-**correlation analysis** was **assesses** in 57 events in which after discharges (Ads) appeared in response to stimulation of brain cortical tissue in humans. Mean durations of epoch 1, 2, and 3 were 9.9, 11.3 and 14.5 s, respectively. For controls in **analysis-2**, 59 events were chosen in which ADs did not appear after cortical stimulation. Significant differences of WCC values tended to occur between epochs 1 and 2, and 2 and 3. On the other hand, there were few significant differences in WCC between epochs 1 and 3. The results suggested that activity propagated from one electrode to another with a time lag. Short time lags (less than 10 milliseconds) occurred less frequently during epoch 2, but that time lags of 10 milliseconds occurred more frequently during epoch 2. In summary, results indicated that there were differences in WCC and TL when **comparing** among different epochs. These differences can be utilized to **determine** when seizures are likely to occur and to **determine** where they are originating and direction of propagation.

USE - The method is for treating medical disorder selected from seizure, headache, pain, trauma, hemorrhage, encephalitis, localized myelitis, mass lesions, psychiatric disorders, swelling and inflammation and the organs, tissue or cells responsible for the disorder can be central nervous system tissue, muscle, bones, cartilage, connective tissues and skin. Method (1) for treating brain disorders selected from epilepsy, intractable pain, psychiatric and movement disorders (all claimed).

ADVANTAGE - The methods of the invention improve effectiveness of stimulation for treating disorders of function of brain or elsewhere in the central nervous system, or in peripheral nerve.

Methods for treating medical disorders, particularly brain disorders selected from epilepsy, comprises using heat transfer, electrical stimulation or delivery of medication Abstract ...NOVELTY - A method of treating a medical disorder comprises: (a) surgically implanting into a patient at least one **sensor** element; (b) attaching a management unit such that a micro controller of the management unit is connected to at least one **sensor** element; (c) connecting the management unit via a lead bundle to at least one stimulating electrode and at least one treatment device. ... surgically implanting into a patient at least one **sensor** element capable of **detecting** and conveying cell signals; attaching a management unit such that a micro controller of the management unit is connected to at least one **sensor** element; and connecting the management unit via a lead bundle to at least one stimulating electrode and at least one treatment device such that a... ... At least one treatment device is selected from electrical stimulation, heat **transfer**, magnetic stimulation and **medication delivery** devices. It is responsive to signals from at least one **sensor** element, mathematical algorithms of the management unit perform one or more mathematical **analyses** comprising **quantification** of waveform amplitude, slope, curvature, rhythmicity, time-lag or frequency as well as **analysis** based on wavelets such as wavelet-cross **correlation analysis** and time-lag **analysis** of cell signals to **prompt** delivery of electrical stimulation and at least one treatment to cells responsible for the medical disorder... ... a method of treating a brain disorder by **electrical stimulation** by: surgically **implanting** into a patient one or more electrical **sensor** elements capable of **detecting** and conveying signals from brain cells; surgically **implanting an electrical stimulator** control unit into a body cavity of the patient such that a microcontroller of the electrical stimulator unit is connected to the one or more electrical **sensor** elements in contact with brain cells; and connecting the electrical stimulator control unit to one or more stimulating electrodes via a lead bundle, the stimulating... ... being capable of delivering to brain cells one or more symmetric or asymmetric current pulses; whereby responsive to signals from the one or more electrical **sensor** elements, mathematical algorithms of the micro controller perform one or more mathematical **analyses** including **quantification** of waveform amplitude, slope, curvature, rhythmicity, time-lag, or frequency as well as **analyses** based on wavelets such as wavelet cross-**correlation analysis** of brain cells signals so as to **predict** onset of seizure activity thereby causing a stimulating switch to **prompt** stimulating electrodes to deliver the one or more symmetric or asymmetric current pulses to the brain, thereby halting abnormal brain cell activity in the patient; and a device for treating a medical disorder comprises: at least one **sensor** element capable of **detecting** and conveying cell signals; a management unit positioned such that a microcontroller of the unit connects to the **sensor** element(s); an electrical stimulation device connected to the unit via a lead bundle such that a stimulation switch sends one or more current pulses to the electrical stimulation device; and optionally at least one other treatment device; whereby responsive to signals from the **sensor** element(s), mathematical algorithms of the unit perform **analyses** including wavelet cross **correlation analysis** to **prompt** delivery of one or more current pulses and optionally at least one other treatment to organs tissues or cells responsible for the disorder... ... The value of wavelet cross-**correlation analysis**

was assessed in 57 events in which after discharges (Ads) appeared in response to stimulation of brain cortical tissue in humans. Mean durations of epoch 1, 2, and 3 were 9.9, 11.3 and 14.5 s, respectively. For controls in **analysis-2**, 59 events were chosen in which ADs did not appear after cortical stimulation. Significant differences of WCC values tended to occur between epochs 1...that time lags of 10 milliseconds occurred more frequently during epoch 2. In summary, results indicated that there were differences in WCC and TL when **comparing** among different epochs. These differences can be utilized to **determine** when seizures are likely to occur and to **determine** where they are originating and direction of propagation...

Technology Focus BIOLOGY - Preferred Method: The method further comprises maintaining charge balance of a current pulse sequence by dynamic **feedback**. At least one treatment is selected from heat **transfer**, magnetic stimulation and **medication**. At least one **sensor** element is a member selected from temperature **sensor** elements and activity **sensor** elements, the latter being chosen from electrical **sensing** and chemical **sensing** elements and elements **sensing** blood flow changes, elements **sensing** ionic, hormonal, pH, osmolarity, enzyme activity, osmolarity, cellular function and/or optical changes. The method further comprises surgically implanting one or more **sensor** elements capable of **detecting** and conveying signals from a non-central nervous system organ (peripheral nerves, muscles, neck organs, thoracic organs, abdominal organs, pelvic organs and extremities), thereby **detecting** abnormal organ cell activity, treatment being effected by at least one treatment device selected from electrical stimulation, heat **transfer**, magnetic stimulation and **medication delivery** devices.... The timing of the treatment is **determined** using mathematical **analysis**, including wavelet-cross **correlation analysis** producing wavelet-correlation coefficients and time lag information among **sensor** elements. **Sensor** element signals are selected from EEG, ionic, blood flow, enzyme activity, hormonal, pH, osmolarity or similar changes.... The method additionally includes **analyzing** organ tissue or cell activity using a computer algorithm and **correlating** the activity with previous treatment. One or more pulses have a morphology selected from the group consisting of negative phase first, positive phase first, symmetric pulse, asymmetric pulse, pulse of limited duration, pulse with waveform controlled by dynamic **feedback**, pulse waveform occurring in random order, waveform occurring with random morphology, pulse waveform occurring with variable morphology and morphology respective of total duration of pulse.... Polarity of initial pulse is **determined** by algorithm.... The method (1) also comprises **notifying** a patient of abnormal activity via a **notification signal** selected from sound, a **visual signal**, vibration, an infrared signal, a telemetered signal to an external device and a signal to a **wireless** or internet device.... The device in (3) further comprises means for maintaining charge balance of a current pulse sequence by dynamic **feed back** and it has further means of a **notification signal** selected from sound, a **visual signal**, vibration, an infrared signal, a telemetered signal to an external device and a signal to a **wireless** or internet device.

Extension Abstract ADMINISTRATION - In method (1), **administration of medication** is systemically or directly into the brain (claimed). Treatment is local or regional to the organ, tissue or cells. One treatment device is planted in the body including the chest, abdomen, subcutaneous pocket, skin or subclavicular pocket, and one **sensor** element is located external to patient's body (claimed).

Abstracts: **Analytical methods and devices for analyzing biological signals,** for example, electrical signals from the brain to **determine** whether an abnormal condition caused by a medical condition exists. In one embodiment, the medical disorder may be epilepsy. The **analytical** methods include wavelet **analysis** and neighbor cross-**correlation** count, which is a frequency specific **measure** of the degree of **correlation** of a single channel of data with respect to its neighbors. The devices according to the invention are programmed to include the **analytical** methods and to **administer** treatment regimens such as electrical stimulation, heating, cooling and **medication** as needed.... A device and method of use for treating a medical disorder by surgically implanting into a patient at least one **sensor** element capable of **detecting** and conveying cell signals; attaching a management unit such that a micro controller of the management unit is connected to at least one **sensor** element; and connecting the management unit via a lead bundle to at least one treatment device. The treatment device may be an electrical stimulation device, a magnetic stimulation device, a heat **transfer** device, or a **medication delivery** device. Responsive to signals from the one or more **sensor** elements, mathematical algorithms of the management unit use wavelet crosscorrelation **analysis** to **prompt** delivery of at least one treatment modality, such heat **transfer**, current pulses, magnetic stimulation or **medication**. The medical disorder may arise from the brain, central nervous system or organs and tissues outside of the central nervous system.... A device and a method of use for treating a medical disorder by surgically implanting into a patient at least one **sensor** element capable of **detecting** and conveying cell signals; attaching a management unit such that a micro controller of the management unit is connected to at least one **sensor** element; and connecting the management unit via a lead bundle to at least one treatment device. The treatment device may be an electrical stimulation device, a magnetic stimulation device, a heat **transfer** device, or a **medication delivery** device. Responsive to signals from the one or more **sensor** elements, mathematical algorithms of the management unit use wavelet crosscorrelation **analysis** to **prompt** delivery of at least one treatment modality, such heat **transfer**, current pulses, magnetic stimulation or **medication**. The medical disorder may arise from the brain, central nervous system or organs and tissues outside of the central nervous system.... **Analytical methods and devices for analyzing biological signals,** for example, electrical signals from the brain to **determine** whether an abnormal condition caused by a medical condition exists. In one embodiment, the medical disorder may be epilepsy. The **analytical** methods include wavelet **analysis** and neighbor cross-**correlation** count, which is a frequency specific **measure** of the degree of **correlation** of a single channel of data with respect to its neighbors. The devices according to the invention are programmed to include the **analytical** methods and to **administer** treatment regimens such as electrical stimulation, heating, cooling and **medication** as needed.... A device and method of use for treating a medical disorder by surgically implanting into a patient at least one **sensor** element capable of **detecting** and conveying cell signals; attaching a management unit such that a micro controller of the management unit is connected to at least one **sensor** element; and connecting the management unit via a lead bundle to at least one treatment device. The treatment device may be an electrical stimulation device, a magnetic stimulation device, a heat **transfer** device, or a **medication delivery** device. Responsive to signals from the one or more **sensor** elements, mathematical algorithms of the management unit use wavelet crosscorrelation

analysis to prompt delivery of at least one treatment modality, such heat **transfer**, current pulses, magnetic stimulation or **medication**. The medical disorder may arise from the brain, central nervous system or organs and tissues outside of the central nervous system.... **Claims:**What is claimed is:1. A method of **analyzing** a plurality of biological signals, comprising:performing a wavelet transform on the plurality of biological signals; andfor at least one wavelet scale used in said performing:**calculating** the degree of **correlation** of each of the plurality of transformed biological signals with respect to at least one of the plurality of transformed biological signals;defining a **correlation** threshold;counting ones of the plurality of transformed biological signals having **correlations** to the at least one of the plurality of transformed biological signals that are greater than the **correlation** threshold; and**comparing** the results of said counting to a total number of possible **correlations**.... **1. A method of treating a medical disorder, comprising:monitoring** at least one sensor that senses physiological activity in one or more organs or organ systems;performing a wavelet cross-correlation analysis on data obtained from said monitoring to determine whether an abnormal state caused by the medical disorder exists; andif the abnormal state exists, administering one or more treatments selected from the group... **What is claimed is:**1. A method of analyzing a plurality of biological signals, comprising: performing a wavelet transform on the plurality of biological signals; andfor at least one wavelet scale used in said performing: calculating a degree of cross-correlation of each of the plurality of transformed biological signals with respect to at least one of the plurality of transformed biological signals;defining a correlation threshold;counting ones of the plurality of transformed biological signals having correlations to the at least one of the plurality of transformed biological signals that are greater than the correlation threshold; andcomparing the results of said counting to a total number of possible correlations.>

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 68/5,K/9 (Item 9 from file: 350)
 DIALOG(R)File 350: Derwent WPIX
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0010690601

WPI Acc no: 2001-300280/200131

Related WPI Acc No: 2002-598804; 2004-314625

Drug delivery system used with cardiac device, e.g. cardioverter for delivering drug dosage to patient, has telemetry interface, circuitry for demodulating radio signals, and circuitry for controlling the delivery of drug

Patent Assignee: CARDIAC PACEMAKERS INC (BSCI)

Inventor: GIROUARD S D; HEIL R W; HERNER M; SCHEINER A

Patent Family (5 patents, 22 countries)

Patent Number	Kind	Date	Application Number	Kind	Date	Update	Type
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WO 2001028609	A2	20010426	WO 2000US41214	A	20001018	200131	B
AU 200119676	A	20010430	AU 200119676	A	20001018	200148	E
US 6361522	B1	20020326	US 1999422433	A	19991021	200226	E
US 20020099328	A1	20020725	US 1999422433	A	19991021	200254	E
			US 2001999260	A	20011130		
US 7201733	B2	20070410	US 1999422433	A	19991021	200726	E
			US 2001999260	A	20011130		

Alerting Abstract WO A2

NOVELTY - A **drug delivery** system comprises a **cardiac device** and an external **drug delivery** device. The external **drug delivery** device is for affixation to a patient. It also comprises a telemetry interface, circuitry for demodulating radio signals, and circuitry for controlling the **delivery of drug** accordingly.

DESCRIPTION - A **drug delivery** system comprises a **cardiac device** and an external **drug delivery** device. The **cardiac device** has **sensing** channel for electrical activity occurring in a patient's heart and for generating **sensing** signal. It has a circuitry for **detecting** a medical condition from the **extracted** information and generating command signal in case medical condition is present. It has also a telemetry interface for **receiving** and **transmitting** radio frequency signals and circuitry for modulating the signals with information relating to the command signal. The external **drug delivery** device is for affixation to a patient. It also comprises a telemetry interface, circuitry for demodulating radio signals, and circuitry for controlling the **delivery of drug** accordingly.

An **INDEPENDENT CLAIM** is also included for a method comprising **extracting** information from **sensed** activity to **determine** if medical condition is present, and **transmitting** a command signal to a **drug delivery** device via a radio link, in case medical condition is present.

USE - Used with a **cardiac device**, such as **cardioverter** or defibrillator, cardiac **pacemaker**, for **delivering drug** dosage to a patient. The device is also for **detecting** cardiac ischemia and arrhythmia. (all claimed)

ADVANTAGE - The invention is programmable, thus **determining** the drug dosage that produces the desired physiological effect. It maintains downloadable logs of the received **sensed** activity and of amounts of **administered drugs**. Thus, degradation and leakage of **drugs** are prevented.

Drug delivery system used with cardiac device, e.g. cardioverter for delivering drug dosage to patient, has telemetry interface, circuitry for demodulating radio signals, and circuitry for controlling the delivery of drug Alerting Abstract ...**NOVELTY** - A **drug delivery** system comprises a **cardiac device** and an external **drug delivery** device. The external **drug delivery** device is for affixation to a patient. It also comprises a telemetry interface, circuitry for demodulating radio signals, and circuitry for controlling the **delivery of drug** accordingly. **DESCRIPTION** - A **drug delivery** system comprises a **cardiac device** and an external **drug delivery** device. The **cardiac device** has **sensing** channel for electrical activity occurring in a patient's heart and for generating **sensing**

signal. It has a circuitry for **detecting** a medical condition from the **extracted** information and generating command signal in case medical condition is present. It has also a telemetry interface for **receiving** and **transmitting** radio frequency signals and circuitry for modulating the signals with information relating to the command signal. The external **drug delivery** device is for affixation to a patient. It also comprises a telemetry interface, circuitry for demodulating radio signals, and circuitry for controlling the **delivery** of **drug** accordingly... ..An INDEPENDENT CLAIM is also included for a method comprising **extracting** information from **sensed** activity to **determine** if medical condition is present, and **transmitting** a command signal to a **drug delivery** device via a radio link, in case medical condition is present... ..USE - Used with a **cardiac device**, such as **cardioverter** or defibrillator, cardiac **pacemaker**, for **delivering drug** dosage to a patient. The device is also for **detecting** cardiac ischemia and arrhythmia. (all claimed)... ..ADVANTAGE - The invention is programmable, thus **determining** the drug dosage that produces the desired physiological effect. It maintains downloadable logs of the received **sensed** activity and of amounts of **administered drugs**. Thus, degradation and leakage of **drugs** are prevented. **Technology Focus INSTRUMENTATION AND TESTING** - Preferred Device: The **drug delivery device** is a modulated **transdermal injector** comprising a first electrode that is connected to a first **drug** reservoir; a second electrode for contacting the patient's skin; and a controllable power source for connecting the electrodes and imposing a voltage. It is configured to transmit a status signal back to the **cardiac device** after receipt of command signal. The second electrode is connected to a second **drug** reservoir for simultaneous **delivery** of **drugs**. The **cardiac device** sends command signal upon **detection** of a cardiac arrhythmia or myocardial ischemia. The command signal is generated by a **cardiac device** through the external programmer. **Abstracts:**A **drug delivery** system incorporated into a **cardiac device** for **delivering** a dose of a **drug** to a patient upon **detection** of a particular medical condition. The **cardiac device** may be, for example, an **implantable cardioverter/defibrillator**, **cardiac pacemaker**, or combination device that communicates via a radio frequency link with a **drug delivery** device. The **drug delivery** device is preferably an electrically modulated **transdermal drug delivery device** for **delivering** the **drug** transdermally in accordance with a signal received from the **cardiac device**. A **drug delivery** system incorporated into a **cardiac device** for **delivering** a dose of a **drug** to a patient upon **detection** of a particular medical condition. The **cardiac device** may be, for example, an **implantable cardioverter/defibrillator**, **cardiac pacemaker**, or combination device that communicates via a radio frequency link with a **drug delivery** device. The **drug delivery** device is preferably an electrically modulated **transdermal drug delivery device** for **delivering** the **drug** transdermally in accordance with a signal received from the **cardiac device**. A **drug delivery** system incorporated into a **cardiac device** for **delivering** a dose of a **drug** to a patient upon **detection** of a particular medical condition. The **cardiac device** may be, for example, an **implantable cardioverter/defibrillator**, **cardiac pacemaker**, or combination device that communicates via a radio frequency link with a **drug delivery** device. The **drug delivery** device is preferably an electrically modulated **transdermal drug delivery device** for **delivering** the **drug** transdermally in accordance with a signal received from the **cardiac device**. A **drug delivery** system incorporated into a **cardiac device** for **delivering** a dose of a **drug** to a patient upon **detection** of a particular medical condition. The **cardiac device** may be, for example, an

implantable cardioverter/defibrillator, cardiac pacemaker, or combination device that communicates via a radio frequency link with a **drug delivery device**. The **drug delivery device** is preferably an electrically modulated **transdermal drug delivery device for delivering the drug** transdermally in accordance with a signal received from the **cardiac device**. ... What is claimed is: 1. A **drug delivery system** comprising: a **cardiac device** comprising a **sensing channel for sensing electrical activity** occurring in a patient's heart and generating **sensing signals** in accordance therewith, circuitry for **extracting information from the sensing signals**, circuitry for **detecting a particular medical condition from the extracted information** and generating a command signal if the medical condition is present, a telemetry interface for **receiving and transmitting radio frequency signals**, and circuitry for modulating the radio frequency signals with information relating to the command signal; and, an external **drug delivery device** for affixation to a patient having incorporated therein a telemetry interface for **receiving and transmitting radio frequency signals**, circuitry for demodulating radio signals to **derive a command signal therefrom**, and circuitry for controlling the **drug delivery device** in order to **deliver a drug** in accordance with the command signal... A **drug delivery system** comprising: an **implantable cardiac device** comprising an electrode connected to a **sensing amplifier** by a lead for **sensing electrical activity** occurring in a patient's heart and generating **sensing signals** in accordance therewith, circuitry for **extracting information from the sensing signals**, circuitry for **detecting a particular medical condition from the extracted information** and generating a command signal if the medical condition is present, a first telemetry interface for **receiving and transmitting radio frequency signals**, and circuitry for modulating the radio frequency signals with information relating to the command signal; and, an external **drug delivery device** for affixation to a location on the skin surface of a patient having incorporated therein a second telemetry interface for **receiving and transmitting radio frequency signals**, circuitry for demodulating radio signals to **derive the command signal therefrom**, and circuitry for controlling the **drug delivery device** in order to **deliver a drug** in accordance with the command signal... What is claimed is: 1. A **drug delivery system** comprising: an **implantable cardiac device** having incorporated therein a **sensor for sensing a physiological variable** in a patient, a first telemetry interface for transmitting radio frequency signals, and circuitry for modulating the radio frequency signals with a **drug delivery command signal**; an external **drug delivery device** for affixation to a skin surface location on the patient, the **drug delivery device** having incorporated therein a second telemetry interface for receiving radio frequency signals, circuitry for demodulating radio signals to **derive a drug delivery command signal therefrom**, and circuitry for controlling the **drug delivery device** in order to **deliver a drug** upon receipt of a **drug delivery command signal**; wherein the **implantable cardiac device** is programmed to **transmit a drug delivery command signal** to the external **drug delivery device** in response to the **sensed physiological variable** in a manner that attempts to control the **sensed variable** in a **closed-loop** fashion; and, wherein the system is programmed to maintain a downloadable log of the **sensed physiological variable** and of the amount of **drug administered** by the **drug delivery device** that can be used to formulate an optimum **drug dosage schedule** for the patient.

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0010299414 *Drawing available*
 WPI Acc no: 2000-613097/200059
 XRPX Acc No: N2000-454218

Implantable communication network device; has devices performing monitoring or drug delivery implanted in patient and communication via internal or external networks

Patent Assignee: SUN MICROSYSTEMS INC (SUNM)

Inventor: ARENT M; ARENT M A

Patent Family (2 patents, 26 countries)							
Patent Number	Kind	Date	Application Number	Kind	Date	Update	Type
EP 1022035	A1	20000726	EP 2000300499	A	20000124	200059	B
US 6358202	B1	20020319	US 1999117116	P	19990125	200224	E
			US 2000483214	A	20000114		

Alerting Abstract EP A1

NOVELTY - The patient (102) has a number of **devices implanted** . These include **subcutaneous devices** (104,106), **transdermal devices** (108,109) or external devices, e.g. wrist strap based devices. The devices may **monitor** physiological parameters, **deliver drugs** or perform other control actions, e.g. **heart stimulation**. Each **device** includes a network component allowing communication with the other units directly or via intermediate units.

DESCRIPTION - The network can be via radio or external links.

INDEPENDENT CLAIMS are included for a computer network incorporating several network devices and for a method for **monitoring** a patient using the network devices.

USE - **Interaction between implanted medical devices**

ADVANTAGE - Allows devices to be spread around the patient's body and still operate in co-operation with each other, e.g. **monitor and drug delivery**

DESCRIPTION OF DRAWINGS - The figure illustrates a **wireless** network including implanted and external medical devices and **sensors** in addition to external communications, storage and display devices according to the invention.

102 Patient

104,106 **Subcutaneously implanted** networked devices

108,109 **Transdermally implanted** networked devices

110,111 Communication devices

112 Network

114 Data storage device

116 Printer

118 Workstation or other computer

120,122 Satellite link

124 **Monitor**

Implantable communication network device; has devices performing monitoring or drug delivery implanted in patient and communication via internal or external networks Alerting Abstract ...NOVELTY - The patient (102) has a number of **devices implanted**. These include **subcutaneous devices** (104,106), **transdermal devices** (108,109) or external devices, e.g. wrist strap based devices. The devices may **monitor** physiological parameters, **deliver drugs** or perform other control actions, e.g. **heart stimulation**. Each **device** includes a network component allowing communication with the other units directly or via intermediate units. ...INDEPENDENT CLAIMS are included for a computer network incorporating several network devices and for a method for **monitoring** a patient using the network devices... ...USE - **Interaction** between **implanted medical devices**ADVANTAGE - Allows devices to be spread around the patient's body and still operate in co-operation with each other, e.g. **monitor** and **drug delivery**DESCRIPTION OF DRAWINGS - The figure illustrates a **wireless** network including implanted and external medical devices and **sensors** in addition to external communications, storage and display devices according to the invention... ...104,106 **Subcutaneously implanted networked devices**108,109 **Transdermally implanted networked devices**124 **Monitor**

Abstracts:A network device (104-111, 200) that can be implanted in a subject (102) is described. The device is configured to communicate over an internal **wireless** network or over an external computer network (112). In one embodiment, the device (200) of the invention includes an internal interface (212) in physiological communication with the subject (102)... receive and process the signals, and is further configured to communicate over a computer network with another such device. Such devices can be used to **monitor** and communicate information (**Figures 4, 5, 6**) regarding a host's physiological status, **monitor** and/or control **natural** (710) and/or artificial organs and prosthetic devices, and/or **dispense medication** (716). ... receive and process the signals, and is further configured to communicate over a computer network with another such device. Such devices can be used to **monitor** and communicate information regarding a host's physiological status, **monitor** and/or control artificial **organs** and prosthetic devices, and/or **dispense medication**.

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68/5,K/19 (Item 19 from file: 350)

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0006619657 *Drawing available*

WPI Acc no: 1993-329306/199342

XRPX Acc No: N1993-254261

Implantable device for monitoring and detecting sympatho-vagal activity - measures

sympatho-vagal activity continuously with time constants to pilot pharmacological and/or electrical therapeutic action using variability of heart rate evaluated from consecutive R-R intervals

Patent Assignee: SORIN BIOCHIMICA SPA (SORI-N); SORIN BIOMEDICA CARDIO SPA (SORI-N); SORIN BIOMEDICA SPA (SORI-N)

Inventor: CORBUCCI G

Patent Family (7 patents, 16 countries)							
Patent Number	Kind	Date	Application Number	Kind	Date	Update	Type
EP 565909	A2	19931020	EP 1993104719	A	19930323	199342	B
IT 1259358	B	19960312	IT 1992TO268	A	19920326	199638	E
EP 565909	A3	19960724	EP 1993104719	A	19930323	199639	E
US 5645570	A	19970708	US 199336934	A	19930325	199733	E
			US 1994261497	A	19940617		
EP 565909	B1	20010516	EP 1993104719	A	19930323	200128	E
DE 69330217	E	20010621	DE 69330217	A	19930323	200143	E
			EP 1993104719	A	19930323		
ES 2158850	T3	20010916	EP 1993104719	A	19930323	200164	E

Priority Applications (no., kind, date): IT 1992TO268 A 19920326

Alerting Abstract EP A2

The device includes input terminals (2) on which an ECG signal is present. An atrial ECG electrode (2a) and a ventricular ECG electrode (2b) are connected to an analogue-to-digital interface (3) which transfers the input signals (2a, 2b) to the input of a microprocessor (4), which together with ROM (5) and RAM (6) forms a control and processing system (7). The system (7) includes a clock (8) and an output interface module (9) which pilots the therapeutic device via output terminals (10). A bi-directional telemetry system (11) includes a reception-transmission interface (12) connected to the microprocessor, and a radio-frequency receiver-transmitter (13) connected with the interface leading to an aerial (14). The processing and control circuit (7) supervises all operating phases of the device and processes data coming from adjacent interfaces.

USE/ADVANTAGE - Producing updated information on sympatho-vagal balance for controlling therapeutic sequence of pharmacological and/or electrical nature, eg neurological stimulator or pharmaceutical dose delivery system. Detecting ECG is based on selective intracardiac sensing rather than surface electrodes.

...**Claims:**at least one band of normality values for the said sympatho-vagal activity to enable the said therapeutic means (D) to be piloted when the **detected** sympatho-vagal activity departs from the said band of normality values, said normality **band** being

defined as the band within which a number of useful events counted must lie, and the said processor means (1) **detect** the consecutive R-R intervals and then **compare** them with a rejection discrimination threshold, the **events** which exceed said threshold value being defined as said useful events.... A method of providing therapy to a patient comprising: implanting at least one **sensor** in the proximity of the patient's heart; **sensing** the electrical activity of the patient's heart from the at least one **sensor**; generating an electrocardiology signal from the **sensed** electrical activity of the patient's **heart**; **repeatedly calculating** from the signal a time differential between consecutive R-R intervals; **comparing** the time differentials with a predetermined time differential threshold value; counting the number of time differentials which exceed the predetermined time differential threshold value during a predetermined time interval, that number **being** equal to the number of useful events; **determining** whether the number of useful **events** lies within a predetermined band of normal values; and providing therapy to the patient if the number of useful events does not lie within the predetermined band of normal values.

1. A method of providing therapy to a patient comprising:

implanting at least one sensor in the proximity of the patient's heart;

sensing the electrical activity of the patient's heart from the at least one sensor;

generating an electrocardiology signal from the sensed electrical activity of the patient's heart;

repeatedly calculating from the signal a time differential between consecutive R-R intervals;

comparing the time differentials with a predetermined time differential threshold value;

counting the number of time differentials which exceed the predetermined time differential threshold value during a predetermined time interval, that number being equal to the number of useful events;

determining whether the number of useful events lies within a predetermined band of normal values; and

providing therapy to the patient if the number of useful events does not lie within the predetermined band of normal values.

2. The method of claim 1 wherein the step of providing therapy comprises delivery of a pharmaceutical agent to the patient.

3. The method of claim 1 wherein the step of providing therapy comprises delivering electrical stimulation to the patient.

20. The device of claim 19 wherein the means for sensing, calculating, comparing, counting and determining are integrated within a single implantable assembly.

36. A device for providing therapy to a patient comprising:

at least one sensor sized for implantation within the patient having an output indicative of the electrical activity of the patient's heart;

a signal generator connected to receive the output of the at least one sensor and responsive thereto to generate an electrocardiology signal;

a processor connected to receive the cardiology signal and to:

a) repeatedly calculate from the signal a time differential between consecutive R-R intervals;

b) compare the time-differentials with a predetermined time differential threshold value;

c) count the number of time differentials which exceed the predetermined time differential threshold value during a predetermined time interval, that number being equal to the number of useful events; and

d) determine whether the number of useful events lies within a predetermined band of normal values;

the processor producing an output signal indicative of the sympatho-vagal activity of the patient's heart; and

a therapy dispenser responsive to the processor output signal to dispense therapy to the patient if the number of useful events does not lie within the predetermined band of normal values.

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0010259094 *Drawing available*
WPI Acc no: 2000-571467/200053
XRAM Acc no: C2000-170308
XRPX Acc No: N2000-422723

Implantable system for automatically detecting onset of myocardial infraction and prompt release of medication using electronic detection circuit

Patent Assignee: CATHCO INC (CATH-N)

Inventor: FISCHHELL D R; FISCHHELL R E; FISCHHELL T A

Patent Family (1 patents, 1 countries)

Patent Number	Kind	Date	Application Number	Kind	Date	Update	Type
US 6112116	A	20000829	US 1999253872	A	19990222	200053	B

Alerting Abstract US A

NOVELTY - An implantable system for automatically **detecting** onset of myocardial infraction and **prompt release of medication** using electronic **detection** circuit, is new. DESCRIPTION - The system comprises a **sensor** (which **detects** a signal from within the human body indicating onset of myocardial infraction) and a **medication release** device.

The **sensor** can consist of at least two electrodes which **sense** the electrogram from the patient. The electrodes are placed within right ventricle, atrium or superior vena cava.

The **medication release** device includes a metal case, as many as three **medication** reservoir entry ports and three catheters. The electric circuitry is capable of **recording** and playing back electrograms, and includes a radio **transmitter** for **transmitting** information from the implanted **medication release** system to the physician's programmer. The infraction can be **detected** from the patient's electrocardiogram by noting ST segment deviation, i.e. voltage increase, as **compared** to the voltage of the patient's TP or PQ segments. The ST segment deviation electronic **detection** circuit within the implanted system produces an output signal that causes immediate and automatic **release** of the agent into the patient's bloodstream.

USE - For automatic **detection** of onset of myocardial infraction, **warning** the patient that a myocardial infraction is occurring and promptly **releasing medication** into the bloodstream in order to dissolve obstructive thrombus in a coronary artery. The system can also be used for insulin dependent diabetics.

ADVANTAGE - Thrombolytic and/or anti-thrombogenic agent is automatically released into the bloodstream. The patient is automatically informed that a myocardial infraction has occurred. The device can be used in conjunction with an **implantable defibrillator** or **pacemaker**. The system can be integrated to make a telephone call to a rescue service.

DESCRIPTION OF DRAWINGS - The drawing shows the system block diagram with arrangement of equipment that can be implanted in the patient and other equipment

external to the patient.

Implantable system for automatically detecting onset of myocardial infarction and prompt release of medication using electronic detection circuit Abstract

...NOVELTY - An implantable system for automatically **detecting** onset of myocardial infarction and **prompt release** of medication using electronic **detection** circuit, is new.

DESCRIPTION - The system comprises a **sensor** (which **detects** a signal from within the human body indicating onset of myocardial infarction) and a **medication release** device. The **sensor** can consist of at least two electrodes which **sense** the electrogram from the patient. The electrodes are placed within right ventricle, atrium or superior vena cava. The **medication release** device includes a metal case, as many as three **medication** reservoir entry ports and three catheters. The electric circuitry is capable of **recording** and playing back electrograms, and includes a radio **transmitter** for **transmitting** information from the implanted **medication release** system to the physician's programmer. The infarction can be **detected** from the patient's electrocardiogram by noting ST segment deviation, i.e. voltage increase, as **compared** to the voltage of the patient's TP or PQ segments. The ST segment deviation electronic **detection** circuit within the implanted system produces an output signal that causes immediate and automatic **release** of the agent into the patient's bloodstream... ..USE - For automatic **detection** of onset of myocardial infarction, **warning** the patient that a myocardial infarction is occurring and promptly **releasing medication** into the bloodstream in order to dissolve obstructive thrombus in a coronary artery. The system can also be used for insulin dependent diabetics... ..automatically released into the bloodstream. The patient is automatically informed that a myocardial infarction has occurred. The device can be used in conjunction with an **implantable defibrillator** or **pacemaker**. The system can be integrated to make a telephone call to a rescue service... Abstracts:Disclosed is a completely implantable system that can **detect** the occurrence of a myocardial infarction, i.e., a heart attack, and automatically **inject** a thrombolytic and/or anti-thrombogenic agent into the bloodstream to promptly dissolve the thrombus that caused the myocardial infarction and prevent the formation of additional thrombi. It is well known that a myocardial infarction can be **detected** from a patient's electrocardiogram by noting an ST segment voltage deviation as **compared** to the voltage of the patient's TP or PQ segments. Upon **detection** of a myocardial infarction, an ST segment deviation electronic **detection** circuit within the implanted device can produce an output signal that can cause a thrombolytic and/or anti-thrombogenic agent contained within an implanted, pressurized reservoir to immediately and automatically **release medications** into the patient's bloodstream. A patient **warning** system is provided by an audio **alarm** or an electrical tickle within the human body indicating that a myocardial infarction has been **detected**. The implanted system can also send a radio message to an externally located receiver that automatically dials an emergency rescue team to take the patient to a hospital for continuing treatment of his myocardial infarction. An **implantable defibrillator** or **pacemaker** that includes the capability for informing the patient that myocardial infarction has been **detected** is also disclosed. Still further, this invention could also be used without a defibrillator or **pacemaker** but as an implanted system

(without **medications**) whose only function would be the **detection and warning** of myocardial infarction at the earliest possible time. **Claims:** An automatic **detection and responsive medication release system implanted** within a human subject for the treatment of myocardial infarction, the system comprising: a **sensor** having an output **electrical** signal, the **sensor** being adapted to **detect** a signal from **within** the human body that is indicative of the onset of myocardial infarction; and a **medication release device** that contains electrical **circuitry means** that is electrically connected to the **sensor**, the electrical circuit means being **adapted** to provide a triggering signal when the output electrical signal from the **sensor** indicates the occurrence of a myocardial infarction, the medication **release device** also having at **least one medication** reservoir for storing a **medication** and also having a **medication releasing** means for causing that **medication** to be **released** into the **bloodstream** of the **human** subject when the triggering signal from the electrical circuitry means indicates that a myocardial infarction is occurring.

1. An automatic detection and responsive medication release system implanted within a human subject for the treatment of myocardial infarction, the system comprising:

a **sensor** having an output electrical signal, the **sensor** being adapted to detect a signal from within the human body that is indicative of the onset of myocardial infarction; and

a medication release device that contains electrical circuitry means that is electrically connected to the **sensor**, the electrical circuit means being adapted to provide a triggering signal when the output electrical signal from the **sensor** indicates the occurrence of a myocardial infarction, the medication release device also having at least one medication reservoir for storing a medication and also having a medication releasing means for causing that medication to be released into the bloodstream of the human subject when the triggering signal from the electrical circuitry means indicates that a myocardial infarction is occurring.

25. The medication release system of claim 1 wherein the medication releasing means is a conventional drug pump.

33. The medication release system of claim 1 further comprising defibrillation means operated from automatic defibrillation circuitry implanted within the human subject.

34. The medication release system of claim 1 further comprising implantable heart pacemaker circuitry for pacing

the heart of the human subject by means of electrical pulses.

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77/5,K/35 (Item 35 from file: 350)
DIALOG(R)File 350: Derwent WPIX
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0006540771 *Drawing available*

WPI Acc no: 1993-350377/199344

Related WPI Acc No: 1990-374963; 1993-195813; 1991-266115; 1992-315159

XRFX Acc No: N1993-270324

Cardiac electrode lead also providing drug dispensation - has helical wire coated with platinum black particles which decreases electrical losses at electrode-tissue interface

Patent Assignee: POSSIS MEDICAL INC (POSS-N)

Inventor: DUTCHER R G; HILL J C; SCOTT R J

Patent Family (1 patents, 1 countries)							
Patent Number	Kind	Date	Application Number	Kind	Date	Update	Type
US 5255693	A	19931026	US 1989430596	A	19891102	199344	B
			US 1990600627	A	19901022		
			US 1991707681	A	19910530		
			US 1992896663	A	19920610		
				Division of patent		US 4972847	
				C-I-P of patent		US 5040545	
				C-I-P of patent		US 5143090	

Alerting Abstract US A

The helical electrode has a first end section extended into a head and connected to a conductor wire. A helical second end section is extended from the head adapted to be screwed into the myocardium of a heart. The second end section has an outer helical surface terminating in a point with a layer of platinum black particles attached to the entire outer helical surface of the second end section.

The layer of platinum black particles have uniform particles size and generally uniform distribution on the outer surface of the second end section of the electrode. The layer has a continuous and uniform microporous outer platinum black surface locatable in surface

contact with the myocardium of the heart. The layer of platinum black particles decreases electrical losses at the electrode-tissue interface and establishes intimate contact between the electrode and myocardium. It maximises voltage applied to the **myocardium** and lowers **stimulation** thresholds and increases amplitude of **sensed** electrical signals from the myocardium.

USE - For **transmitting** electric signals to the heart, also **monitoring** the electrical activity of the heart and also allowing **dispensing** of steroids or other **drugs** adjacent the stimulation site.

Cardiac electrode lead also providing drug dispensation - Alerting Abstract ...black particles decreases electrical losses at the electrode-tissue interface and establishes intimate contact between the electrode and myocardium. It maximises voltage applied to the **myocardium** and lowers **stimulation** thresholds and increases amplitude of **sensed** electrical signals from the myocardium... USE - For **transmitting** electric signals to the heart, also **monitoring** the electrical activity of the heart and also allowing **dispensing** of steroids or other **drugs** adjacent the stimulation site. **Abstracts:** A cardiac lead for **transmitting** electric current to the heart and/or **sensing** and **monitoring** electrical activity of the heart has an elongated electrical conductor connected to a head. An electrode mounted on the head comprises a helical wire adapted to be turned into... **Claims:** A cardiac lead connectable to a **cardiac management device** for **transmitting** electric current to and/or **receiving** electrical signals from the myocardium of the heart comprising: an elongated flexible conductor wire means, sheath means of non-electrical conductive material surrounding said conductor wire means, an electrical connector attached to the wire means adapted to be connected to a **cardiac management device**, a **head** of non-electrically conductive material connected to said conductor wire means and sheath means, a helical electrode having a first end section extended into said... platinum black particles decreases electrical losses at the electrode-tissue interface, establishes intimate contact between the electrode and myocardium, and maximizes voltage applied to said **myocardium** and **lowers stimulation** thresholds and increases amplitude of **sensed** electrical signals from the myocardium....

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77/5.K/39 (Item 39 from file: 350)
DIALOG(R)File 350: Derwent WPIX
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0006124714 *Drawing available*
WPI Acc no: 1992-366021/199244

XRPX Acc No: N1992-278988

Implantable device for detecting far-field cardiac signals - uses pairs of sensing electrodes, and selects electrode pair signal providing optimum indication of electrogram characteristics

Patent Assignee: MEDTRONIC INC (MEDT)

Inventor: BENNETT T D; COMBS W J; KALLOK; KALLOK M J; KLEIN G J; LEE B B; MEHRA R

Patent Family (8 patents, 17 countries)							
Patent Number	Kind	Date	Application Number	Kind	Date	Update	Type
WO 1992017240	A1	19921015	WO 1992US981	A	19920204	199244	B
AU 199217506	A	19921102	AU 199217506	A	19920204	199305	E
			WO 1992US981	A	19920204		
EP 578748	A1	19940119	EP 1992910148	A	19920204	199403	E
			WO 1992US981	A	19920204		
US 5331966	A	19940726	US 1991681235	A	19910405	199429	E
			US 199370008	A	19930528		
			US 1993168725	A	19931216		
JP 6505662	W	19940630	JP 1992509320	A	19920204	199430	E
			WO 1992US981	A	19920204		
AU 654552	B	19941110	AU 199217506	A	19920204	199445	E
EP 578748	B1	19960501	EP 1992910148	A	19920204	199622	E
			WO 1992US981	A	19920204		
DE 69210395	E	19960605	DE 69210395	A	19920204	199628	E
			EP 1992910148	A	19920204		
			WO 1992US981	A	19920204		

Alerting Abstract WO A1

The **sensing device** includes an **endocardial lead** (12) having tip and ring electrodes (14,16) within the heart right ventricle. An array of **sensing electrodes** (A,B,C) are disposed on a pulse generator housing (10).

The **sensing electrodes** are switchably selectable in sequence to provide generally orthogonally disposed electrode pairs. The **sensed signals** are stored and **compared**. The electrode pair signal providing optimum indication of the cardiac signal characteristics is selected for use in **detecting capture** of the heart by a pacing stimulation pulse.

USE/ADVANTAGE - For use with cardiac **pacemaker**, defibrillator, **drug dispensing pump**, etc. Provides orientation insensitive cardiac signal **detection**.

Implantable device for detecting far-field cardiac signals... ...uses pairs of sensing electrodes, and selects electrode pair signal providing optimum indication of electrogram characteristics ... **Abstract** ...The sensing device includes an endocardial lead (12) having tip and ring electrodes (14,16) within the heart right ventricle. An array of sensing electrodes (A,B,C) are disposed on a pulse generator housing (10... ..The sensing electrodes are switchably selectable in sequence to provide generally orthogonally disposed electrode pairs. The sensed signals are stored and compared. The electrode pair signal providing optimum indication of the cardiac signal characteristics is selected for use in detecting capture of the heart by a pacing stimulation pulse... ..**USE/ADVANTAGE** - For use with cardiac pacemaker, defibrillator, drug dispensing pump, etc. Provides orientation insensitive cardiac signal detection. **Equivalent Alerting Abstract** ...The device detects and gathers electrical cardiac signals via an array of relatively closely spaced subcutaneous electrodes (located on the body of an implanted device) which may be... ..This far-field EGM may be used to provide storage and analysis of arrhythmic events and to provide control signals for the delivery of various therapies including pacing, cardioversion and defibrillation therapies as well as the delivery of antiarrhythmic drugs, and, in the pacing context, to effect capture detection and automatic stimulation threshold adaption, recording of PMT episodes, measurement of refractory periods in order to set timing windows for antitachy pacing therapies, and as a control signal for use in adjusting pacing rate to... ..**ADVANTAGE** - EGM signal may be sensed without encountering polarisation effects. **Abstracts:**A method and apparatus for providing an enhanced capability of detecting and gathering electrical cardiac signals via an array of relatively closely spaced subcutaneous electrodes (located on the body of an implanted device) which may be employed with suitable switching circuits, signal processors, and memory to process the electrical cardiac signals between any selected pair or pairs... .. provide a leadless, orientation insensitive means for receiving the electrical signal from the heart. This far-field EGM may be used to provide storage and analysis of arrhythmic events and to provide control signals for the delivery of various therapies including pacing, cardioversion and defibrillation therapies as well as the delivery of antiarrhythmic drugs, and, in the pacing context, to effect capture detection and automatic stimulation threshold adaptation, recording of PMT episodes, measurement of refractory periods in order to set timing windows for antitachy pacing therapies, and as a control signal for use in adjusting pacing rate to physiologic demand. The housing or case of the subcutaneously implanted medical device is modified to provide an array of electrodes which may be selectively or sequentially coupled in one or more pairs to the terminals of one or more sense amplifiers to pick up, amplify and process the electrical cardiac signals across each electrode pair. In one embodiment, the signals from the selected electrode pairs may be stored and compared to one another in order to determine the sensing vector which provides the largest cardiac signal (in a test mode). Following completion of the test mode, the system may employ the selected subcutaneous ECG signal vector for a number of applications. The implanted device possesses analog-to-digital conversion circuitry for sampling and converting the selected subcutaneous ECG signal to digital data which is stored in... .. data retrieval either periodically or upon the occurrence of an event of

interest. In another embodiment, the selected subcutaneous ECG signal is used to confirm **capture** in conjunction with an algorithm for **determining the stimulation threshold of the heart** and set **stimulation pulse energy** at a level exceeding the threshold by a desired safety margin. Further embodiments include replacing the switching approach with parallel linear and nonlinear combinational processing of the... .. A method and apparatus for providing an enhanced capability of **detecting and gathering electrical cardiac signals** via an array of relatively closely spaced subcutaneous electrodes (located on the body of an **implanted device**) which may be employed with suitable switching circuits, signal processors, and memory to process the electrical cardiac signals between any selected pair or pairs of... .. provide a leadless, orientation insensitive means for receiving the electrical signal from the heart. This far-field EGM may be used to provide storage and **analysis** of arrhythmic events and to provide control signals for the delivery of various therapies including pacing, cardioversion and defibrillation therapies as well as the delivery of antiarrhythmic drugs, and, in the pacing context, to effect **capture detection** and automatic stimulation threshold adaption, **recording of PMT episodes, measurement of refractory periods in order to set timing windows** for antitachy pacing therapies, and as a control signal for use in adjusting pacing rate to physiologic demand... .. A method and apparatus for providing an enhanced capability of **detecting and gathering electrical cardiac signals** via an array of relatively closely spaced subcutaneous **electrodes** (located on the **body of an implanted device**) which may be employed with suitable switching circuits, signal processors, and memory to **process** the electrical **cardiac** signals between any selected pair or pairs of the electrode array in order to provide a leadless, orientation insensitive means for receiving the electrical signal from the heart. This far-field EGM may be used to provide storage and **analysis** of arrhythmic events and to provide control signals for the delivery of various therapies including pacing, cardioversion and defibrillation therapies as well as the delivery of antiarrhythmic drugs, and, in the pacing context, to effect **capture detection and automatic stimulation threshold adaptation, recording of PMT episodes, measurement of refractory periods in order to set timing windows for antitachy pacing therapies, and as a control signal for use in adjusting pacing rate to physiologic demand**. The housing or case of the **subcutaneously implanted medical device** is modified to provide an array of electrodes which may be **selectively or sequentially** coupled in one or more pairs to the terminals of one or more **sense amplifiers** to pick up, amplify and process the electrical cardiac signals across each **electrode pair**. In one embodiment, the signals from the selected electrode pairs may be stored and **compared** to one another in order to **determine the sensing vector** which provides the **largest cardiac signal** (in a test mode). **Following completion of the test mode**, the system may employ the selected subcutaneous ECG signal vector for a number of applications. The **implanted device** possesses analog-to-digital conversion circuitry for sampling and converting the **selected subcutaneous ECG signal** to digital data which is stored in a recirculating buffer, the contents of which are transferred to RAM for later data retrieval either periodically or upon the occurrence of an event of interest. In another embodiment, the selected subcutaneous ECG signal is used to confirm **capture** in conjunction with an algorithm for **determining the stimulation threshold of the heart and set stimulation pulse energy at a level exceeding the threshold by a desired safety margin**. Further embodiments include replacing the switching approach with parallel linear and nonlinear combinational

processing of the signals from the orthogonal electrode pairs of the electrode array...

Claims: The sensing device includes an **endocardial lead (12)** having tip and ring electrodes (14,16) within the heart right ventricle. An array of **sensing electrodes (A,B,C)** are disposed on a pulse generator housing (10)... The **sensing electrodes** are switchable selectable in sequence to provide generally orthogonally disposed electrode pairs. The **sensed signals** are stored and **compared**. The electrode pair signal providing optimum indication of the cardiac signal characteristics is selected for use in **detecting capture** of the heart by a pacing stimulation pulse.... 1. An **implantable medical device** including apparatus (160) for **detecting a far-field cardiac electrogram** signal from **electrodes** located **remote** from the heart, of the type comprising **means** for providing an electrode pair (A,B) coupled to said device and located on said device (10) or in proximity thereto on a lead (12) attached to said device, said electrode pair thereby adapted to be disposed outside the patient's **heart**, said **device** comprising means (148) coupled to **said electrode pair** for **sensing cardiac** electrogram signals appearing across said electrode **pair**, characterized in that:

said apparatus comprises means for providing two or more electrode pairs (A,B,C) in a planar array and coupled to said **implantable medical device**, said electrode pairs located on said device (10) or in proximity thereto on a lead or leads (12) attached to said device, said electrode pairs thereby adapted to be **implanted subcutaneously**, wherein said **sensing means** (148) further comprises means (164,166) for **sensing the cardiac electrogram signals** across each of said pairs of electrodes and for providing first and second cardiac electrogram signals, and wherein said apparatus further comprises means (132) for triggering the operation of said **sensing means** to **sense cardiac electrogram signals** from said electrode **pairs** upon command and means for providing a command signal to said triggering means.... An **apparatus for monitoring cardiac signals**, comprising: a hermetically sealed housing; first and second pairs of electrodes **mounted** to said housing; **sensing means**, located within said housing, for **sensing cardiac signals**; command means, located outside said housing, for providing command signals indicative of which of said first and second electrode pairs are to be coupled to said **sensing means**; selecting means, located within said housing and responsive to said command signals, for selectively coupling said first and second electrode pairs to said **sensing means**; processing means, located within said housing, for processing and converting said **sensed cardiac signals** into data signals; and means for storing said data signals....

A method and apparatus for providing an enhanced capability of detecting and gathering electrical cardiac signals via an array of relatively closely spaced subcutaneous electrodes (located on the body of an implanted device) which may be employed with suitable switching circuits, signal processors, and memory to process the electrical cardiac signals between any selected pair or pairs of the electrode array in order to provide a leadless, orientation insensitive means for receiving the electrical signal from the heart. This far-field EGM may be used to provide storage and analysis of arrhythmic events and to provide control signals for the **delivery** of various therapies including pacing, cardioversion and defibrillation therapies as well as the **delivery** of antiarrhythmic **drugs**, and, in the pacing context, to effect capture detection and automatic stimulation

threshold adaption, recording of PMT episodes, measurement of refractory periods in order to set timing windows for antitachy pacing therapies, and as a control signal for use in adjusting pacing rate to physiologic demand.

US Patent No. - PN (I): 5331966

It has also been proposed that implantable drug administration devices be developed as a substitute for or to augment the aforementioned brady and tachyarrhythmia control stimulation devices. In such systems, it has been proposed that antiarrhythmic drugs be delivered systemically where appropriate upon detection of the arrhythmic episodes or upon detection of other cardiac dysfunctions, such as elevated or depressed blood pressure. With the advent of chronically implantable blood-gas sensors, blood pressure sensors, mechanical activity sensors, and the like, such systems for the combined detection analysis and therapeutic treatment of various cardiac malfunctions appear to be realizable.

Brief Summary Text - BSTX (55):

This sensed far-field EGM may be used to provide storage and analysis of arrhythmic events and to provide control signals for the delivery of various therapies including pacing, cardioversion and defibrillation therapies as well as the delivery of antiarrhythmic drugs, and, in the pacing context, to effect capture detection and automatic stimulation threshold adaptation, recording of PMT episodes, measurement of refractory periods in order to set timing windows for antitachycardia pacing therapies, and as a control signal for use in adjusting pacing rate to physiologic demand.

Detailed Description Text - DETX (25):

The events initiating automatic recording of data may include the operation of a dual chamber cardiac pacemaker at its upper rate limit for a sustained number of beats or predetermined period of time, the switching of the pacing mode from an atrial synchronous mode to a rate responsive mode in response to elevated atrial rates, to track the underlying behavior of the heart in a PMT or spontaneous atrial tachycardia, the detection of an arrhythmia in a

tachyarrhythmia control device, the **delivery** of arrhythmia breaking therapies, and the response of the heart to the **delivery** of a bolus of medication in an automatic **drug** administration device. Alternatively, a purely diagnostic system may be implanted in order to record the patient's far-field EGM in patient's suffering from recurrent bouts of syncope which defy diagnosis by external monitoring and control by drug therapies. The remaining Figures depict signal processing circuitry on systems for implementing the concepts of the invention into preferred embodiments thereof.

Detailed Description Text - DETX (30):

In the context of an arrhythmia control device, such as a pacemaker-cardioverter-defibrillator, the STORE command may precipitate storage of the electrogram preceding and following detection and delivery of a therapy. In the context of a **drug** administration device, the STORE command may precipitate the storage of data related to the detection of an arrhythmia or an abnormal cardiac function detected by another sensor and the **delivery** of a bolus of medication.

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77/5,K/40 (Item 40 from file: 350)
DIALOG(R)File 350: Derwent WPIX
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0005840852 *Drawing available*
WPI Acc no: 1992-066603/199209
XRPX Acc No: N1992-050014

Implanted programmable ambulatory heartbeat signal monitor - senses heartbeat signals with subcutaneous sensor located remote from heart, and detects and reports heart abnormality

Patent Assignee: TELETRONICS NV (TELE-N); TELETRONICS PACING
SYSTEMS INC (TELE-N)

Inventor: DAWSON A K; HURSTA W N; NAPPHOLZ T A; STEINHAUS B M

Patent Family (2 patents, 4 countries)

Patent Number	Kind	Date	Application Number	Kind	Date	Update	Type
EP 472411	A	19920226	EP 1991307673	A	19910821	199209	B
US 5113869	A	19920519	US 1990570379	A	19900821	199223	E

Alerting Abstract EP A

A programmable ambulatory electrocardiography **monitor** (10) is **subcutaneously implanted** at a position **remote** from the heart which permits optimum **diagnosis** of ST segment signals. The **sensed** heartbeat signals are continuously **analysed** by the moritor, and the stored results **transmitted** (15) in burst to external circuitry.

When the **analysis** indicates a hear abnormality the **monitor transmits** a **warning** signal and ectivatus a patient **alarm** (30). The **monitor** may control an external **pacemaker**, defibrillator, or **infusion pump**.

ADVANTAGE - **Continuous** long term **monitoring**, with **warning** of malignant cardiac arrhythmias, and **analysis** of **effects of drugs**. @ (25pp Dwg.No.10/14) @

Alerting Abstract ...A programmable ambulatory electrocardiography **monitor** (10) is **subcutaneously implanted** at a position **remote** from the heart which permits optimum **diagnosis** of ST segment signals. The **sensed** heartbeat signals are continuously **analysed** by the moritor, and the stored results **transmitted** (15) in burst to external circuitry...

...When the **analysis** indicates a hear abnormality the **monitor transmits** a **warning** signal and ectivatus a patient **alarm** (30). The **monitor** may control an external **pacemaker**, defibrillator, or **infusion pump**. ... ADVANTAGE - Continuous long term **monitoring**, with **warning** of malignant cardiac arrhythmias, and **analysis** of effects of **drugs**. ... USE - Controlling defibrillators, antitachycardia **pacemakers** and **drug infusion pumps**. **Abstracts:** An implanted programmable ambulatory electrocardiography (AECG) patient **monitoring** device that **senses** and **analyzes** electrocardiographic **signals** from at least one subcutaneous precordial **sensor** chronically and frequently to **detect** electrocardiogram and physiological **signal** characteristics **predictive** of malignant cardiac arrhythmias. The **device** includes telemetric capabilities to communicate a **warning** signal to an external device when such arrhythmias are **predicted**. ... An implanted programmable ambulatory electrocardiography (AECG) patient **monitoring** device that **senses** and **analyzes** electrocardiographic **signals** from at least one **subcutaneous** precordial **sensor** chronically and frequently to **detect** electrocardiogram and physiological **signal** characteristics **predictive** of malignant cardiac arrhythmias. The **device** includes telemetric **capabilities** to communicate a **warning** signal to an external device when such arrhythmias are **predicted**.

>Claims: 1. A chronically and totally implanted heartbeat signal monitor comprising:
subcutaneous sensing means, located remote from a patient's heart, for sensing heartbeat signals,

means responsive to sensed heartbeat signals for determining a heart abnormality, and means responsive to said determining means for communicating with a message-receiving device to report on a heart abnormality. >

Detailed Description Text - DETX (22):

The implantable AECG monitoring system of the preferred embodiment of the invention includes a number of components. In a particular application, some of the components may not be clinically necessary and are optional. Referring to FIG. 10, system components are the implantable AECG monitor 10 including the transmitter/receiver 15, an external programmer and analyzer 20, a personal communicator alarm device 30, a telephonic communicator 40 which communicates with an external programmer and analyzer 80 in a health care provider's office using modem 70, a full disclosure recorder 50, an external antitachycardia pacemaker or defibrillator 60, and a percutaneous or external drug infusion pump (not shown). The implantable AECG monitor 10 and the external programmer and analyzer 20 are mandatory system components. The need for other components depends on the medical application at hand or objectives of a clinical investigation. All components include at least a telemetry receiver for receiving data and control signals from the implantable AECG monitor 10.

Detailed Description Text - DETX (43):

The implantable AECG monitor 10 can control therapeutic devices including antitachycardia pacemakers and defibrillators 60, and drug infusion pumps. These devices are known in the art and adapted to this invention by the addition of a telemetry receiver and transmitter similar to and compatible with that of the implanted AECG monitor. When the AECG monitor detects a triggering event, it sends control signals by telemetry to an implanted defibrillator or infusion pump.

Detailed Description Text - DETX (44):

In many cases a patient will have an implanted or external antitachycardia pacemaker and defibrillator or a drug infusion pump. Referring to FIG. 12, the implantable AECG monitor 600 sends signals to the personal communicator alarm 620 to notify the patient of the occurrence of a triggering event. The message sent by the monitor may, for

example, be a code requesting attachment of an external defibrillator. The personal communicator alarm notifies and prompts the patient or an attendant to attach external defibrillator paddles 630 and 640, or another therapeutic device to the chest. In a clinical setting, more than one cardiac patient may have an implantable AECG monitor and its associated therapeutic device. The arbitration method discussed previously illustrates how the implantable monitor interacts with the correct personal communicator alarm. A second arbitration scheme is necessary to assure that the monitor interacts with a therapeutic device attached to the same patient. After the patient attaches the therapeutic device, it may inject low level current pulses into the body for the purpose of establishing communication with the implantable AECG monitor using the body as a conductive link. If the therapeutic device is a defibrillator, for example, it will inject current pulses across the paddles. Referring to FIG. 13, the current pulses transmitted by the defibrillator will be superimposed on the electrocardiogram signals of the heart. The current pulses from the therapeutic device are in the form of a timed code or signature which establish that the device and the monitor are connected to the same patient. The implantable AECG monitor detects and decodes the information as pulses within the electrocardiogram. After establishing the communication link in this manner, the implantable monitor will respond to the device over the telemetry link. The therapeutic device must include the telemetry receiver 650 of the aforementioned external devices. The communication between the implantable AECG monitor and the therapeutic device directs the external device to discharge at the appropriate time and in the correct manner.

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77/5,K/42 (Item 42 from file: 350)

DIALOG(R)File 350: Derwent WPIX

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0003486902

WPI Acc no: 1985-262541/198542

Body implantable action device controlling system - has signal from radio transmitter picked up by distal electrode of pacing lead which acts as antenna

Patent Assignee: CORDIS CORP (CRDC)

Inventor: SCHROEPPEL E A

Patent Family (1 patents, 1 countries)							
Patent Number	Kind	Date	Application Number	Kind	Date	Update	Type
US 4543955	A	19851001	US 1983519142	A	19830801	198542	B
			US 1983519149	A	19830801		

Alerting Abstract US A

The system includes a **sensor** assembly for controlling a body implantable action device operable to act upon a body in response to changes in physiological parameter. The **sensor** assembly includes a **transmitter** for **transmitting** coded signals to the action device which has programming circuitry for deciphering the signals received. Once these signals have been deciphered, the programming circuitry can adjust the output from the action device, such as the rate and A-V delay of pacing pulses from the pacing circuitry. The **transmitter** may be a radio **transmitter** and the programming code **transmitted** from it may be picked up by an output terminal, such as a distal electrode of a pacing lead, which acts as a pickup antenna.
 USE - E.g. for **heart pacing device** or **drug infusion pump**.

...has signal from radio transmitter picked up by distal electrode of pacing lead which acts as antenna Alerting Abstract ...The system includes a **sensor** assembly for controlling a body implantable action device operable to act upon a body in response to changes in physiological parameter. The **sensor** assembly includes a **transmitter** for **transmitting** coded signals to the action device which has programming circuitry for deciphering the signals receivedcircuitry can adjust the output from the action device, such as the rate and A-V delay of pacing pulses from the pacing circuitry. The **transmitter** may be a radio **transmitter** and the programming code **transmitted** from it may be picked up by an output terminal, such as a distal electrode of a pacing lead, which acts as a pickup antennaUSE - E.g. for **heart pacing device** or **drug infusion pump**.
Abstracts:The system includes a **sensor** assembly comprising a body implantable physiological **sensor** for controlling a body implantable action device operable to act upon the body in response to changes in a physiological parameter **sensed** by the **sensor**. The body implantable action device can be a **heart pacing device**, a **drug infusion pump**, or other device which acts upon a human body. The **sensor** assembly includes a **transmitter** for **transmitting** coded signals to the action device which has programming circuitry for deciphering the signals received from the **sensor** assembly generated by the **sensor** which is in a location away from the location of the action device. Once these signals have been deciphered, the programming circuitry can adjust the output from the action device, such as the rate and A-V delay of pacing pulses from the pacing circuitry. In one embodiment, the **transmitter** is a radio **transmitter** and the programming code **transmitted** therefrom is picked up by an output terminal, such as a distal electrode of a pacing lead, which acts as a pickup antenna.

1. In a system comprising a body implantable device and a sensor assembly for programming or reprogramming said action device, which device is operable to act upon the body in response to changes in a sensed parameter and which has circuitry for deciphering coded signals used to program said device, the improvement comprising said sensor assembly being a separate, independent assembly which is independent of the action device, which is capable of being implanted within a body, and which includes:

sensor means for sensing a physiological parameter in a body, signal converting circuitry means for converting signals generated by said sensor means to coded electrical signals, such as conventional digital program codes of the type normally used in programming or reprogramming the action device, and transmitting means for transmitting said coded electrical signal related to the sensed parameter to the action device which is operable to decipher the coded electrical signal and act accordingly, upon the body.

2. The system of claim 1 wherein said action device circuitry includes pacer programming circuitry, a program transducer, pacing circuitry and a self-contained power supply coupled together.

3. The system of claim 1 wherein said action device is a body implantable medical dispensing device.

4. The system of claim 3 wherein said action device includes means for adjusting the metering dosage of the medical dispensing device relative to the physiological parameter sensed.

5. The system of claim 1 wherein said action device is a body implantable pacemaker.

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77/5,K/43 (Item 43 from file: 350)

DIALOG(R)File 350: Derwent WPIX

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Self-powered implanted programmable medication system - uses medication storage

and dispensing control circuitry having controls modified by external means

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Patent Family (1 patents, 1 countries)							
Patent Number	Kind	Date	Application Number	Kind	Date	Update	Type
US 4146029	A	19790327	US 1974463262	A	19740423	197915	B
			US 1975636219	A	19751128		
			US 1977802118	A	19770531		

Alerting Abstract US A

The internal implanted circuitry modified by extracorporeal controls so as to provide a selectable, programming capability. Thus, a variety of timing programs can be selected by extracorporeal control. Similarly, a variety of data **evaluation** programs or **dispensing** options can be selected by extracorporeal control with the employment of microprocessor techniques. The interface portion of the circuitry lends itself to use of a variety of peripheral devices such as memory latch controls, various types of **remotely** operable switches, R-F **transmitters** and **receivers** through which information may be sent to and from the implanted microprocessor circuitry in the form of programming changes, operation constraints.

...uses medication storage and dispensing control circuitry having controls modified by external means Alerting Abstract ...so as to provide a selectable, programming capability. Thus, a variety of timing programs can be selected by extracorporeal control. Similarly, a variety of data **evaluation** programs or **dispensing** options can be selected by extracorporeal control with the employment of microprocessor techniques. The interface portion of the circuitry lends itself to use of a variety of peripheral devices such as memory latch controls, various types of **remotely** operable switches, R-F **transmitters** and **receivers** through which information may be sent to and from the implanted microprocessor circuitry in the form of programming changes, operation constraints. **Abstracts:**A device and method for **dispensing medication** internally of the body utilize an implanted system which includes **medication** storage and **dispensing** control circuitry having control components which may be modified by means external of the body being treated to control the manner of **dispensing the medication within such body**. **Coordinated pacemaking** is also available. Basic Derwent Week: 197915

Detailed Description Text - DETX (72):

In another aspect of the invention it is recognized that many cardiac cases would be benefited by having available both a **pacemaking** source as well as a medication source. Thus, the invention contemplates a method and system

associated with an implanted structure utilizing a common control having at least some adjustable parameters and associated with both a **pacemaking** mechanism and a medication dispensing mechanism. The description has already dealt with sensing heart activity and treatment by medication related to such activity. Mention has also been made in connection with FIG. 18 of employing cardiac stimulation in conjunction with controlled medication as related to an implanted system and method using such a system. Thus, it is believed those skilled in the art will readily appreciate and understand the concept of combining both **pacemaking** and medicating functions in a unitary implanted system.

Detailed Description Text - DETX (73):

FIG. 27 broadly illustrates an implanted system having both **pacemaking** and medicating capabilities according to the invention. FIG. 28 illustrates in more detail a similar system utilizing both the medical and circuitry technology previously described. In order to more fully understand the role of the **pacemaking** activity in conjunction with the medicating activity, a brief description will be given of certain aspects of **pacemaking** of particular interest to the invention. From the following description, the reader will gain a better appreciation of the value of an implantable cardiac pacer and medication dispensing combination with mutually shared components such as those involved with timing, sensing, cardiac evaluation and the power source.

1. A self-powered programmable apparatus adapted to be totally received within a selected animal body, including human, for periodically dispensing selected medication therein according to a selected program coordinated with need while leaving the body ambulatory at all times, comprising:

(a) a storage member mounted within the body for storing selected medication to be dispensed therein;

(b) a micro size power source mounted within implanted housing means and having a useful working life in terms of at least several days;

(c) miniaturized dispensing means mounted within implanted housing means and adapted to be operated under programmed electrical control to cause selected said medication to be discharged from the implanted storage member into said body; and

(d) miniaturized programmable electrical control circuit means mounted within implanted housing means and connected to be energized by said power source, said electrical control means being adapted for performing control operations according to program instructions for actuation of said dispensing means, said control means embodying selectable and resettable plural program configurations, each program configuration providing a selection of logic stored digital control data corresponding to a set of predetermined body conditions and medical dispensation therefor, thereby providing in singular and plural programs associated therewith a complex programming capability accommodating differential times and rates, means for extracting said data and means for applying said data to operate said dispensing means, said circuit means being set in a configuration corresponding to one of such programs and being adapted to actuate said dispensing means according to the selected program to dispense said medication within said body at times and rates determined by said program.

2. An apparatus as claimed in claim 1 wherein said circuit means further includes pacemaking circuit means operationally associated and functionally coordinated therewith.
